DEGREE REQUIREMENTS
Biological Engineering Program

A student earning a Bachelor of Science degree in the Biological Engineering Program must complete the following academic requirements. Degree requirements apply to students matriculating in the fall semester of 2014 or later. A minimum of 126 credit hours of courses is required.

Group Subject Matter **Credit Hours**

1. Mathematics 16
(1910, 1920, 2930, 2940)
All math courses in this sequence must be completed with a grade of C- or better.

2. Physics 8
Calculus-based Physics (1112, 2213)

3. Chemistry 7
General Chemistry (2070 or 2090)
Organic Chemistry (1570, 3530 or 3570)

4. Biological Sciences 15
Introductory Biology (8 credits)[a]
Biochemistry or Microbiology (BIOMG 3300 or 3330 or BIOMG 3350 or BIOMG 3310+3320 or BIOMI 2900 recommended) (3 or 4 credits)
Advanced Biological Science (3 or 4 credits)[b]

5. Written Expression 6
First Year Writing Seminars
Technical Writing – one course required. Technical writing courses are listed in the *Courses of Study*, College of Engineering section. BEE 4530, BEE 4590, BEE 4730 and BEE 4890 are approved courses.

6. Liberal Studies (6 courses) 18
Liberal Studies courses are listed in the *Courses of Study*, College of Engineering section.
Minimum of 6 courses in at least 3 of the 7 groups, at least 2 of 6 courses at or above 2000 level.
1. Cultural Analysis (CA)
2. Historical Analysis (HA)
3. Literature and the Arts (LA)
4. Knowledge, Cognition, and Moral Reasoning (KCM)
5. Social and Behavioral Analysis (SBA)
6. Communications in Engineering (CE)
7. Foreign Language (FL, not literature)

7. Computer Programming 4
Intro to Computer Programming - BEE 1510 (or CS 1112)

8. Engineering Distribution and Field Courses (all must be taken for letter grade, except BEE/BME 5010) ... 46

(a) Required Courses
Mechanics of Solids - ENGRD 2020[c] (4 credits)
Engineering Statistics and Probability - ENGRD 2700 or CEE 3040 (recommended) (3 or 4 credits)

(b) Biological Engineering Core Courses
The BEE Experience - BEE 1200 (1 credit) [Not required of students who have completed an ENGRI course]
Engineering Distribution[c] - BEE/ENGRD 2600 (recommended) or BEE/ENGRD 2510 (3 credits)
Biological and Environmental Transport Processes - BEE 3500 (3 credits)
Fluid Mechanics - BEE 3310 or CEE 3310 (4 credits) [Students may petition CHEME 3230 (3 credits).]
Thermodynamics - BEE 2220 or ENGRD 2210 (3 credits). [Students may petition to substitute CHEME 3130 (4 credits); MSE 3030 (4 credits); or AEP 4230 (4 credits).]

(c) Biological Engineering Concentration – three courses from one concentration (minimum of 9 credits), see pages 12-15.

DEGREE REQUIREMENTS (CONT'D)
Biological Engineering Program

Group Subject Matter **Credit Hours**

(d) Major-approved engineering electives to complete 46 engineering credits

BEE and other Engineering courses at 2000 level or above from BEE or the College of Engineering. A maximum of 4 credits of engineering research, project team, teaching or independent study may be used in this category. BEE/BME 5010 may be taken twice. Engineering Laboratory (select one course) - BEE 3650, BEE 4270, BEE 4500, BEE 4550, or CEE 4530. Capstone Design (select one course) – BEE 4350, BEE 4500, BEE 4530, BEE 4590, BEE 4600, BEE 4730, BEE 4740, BEE 4810/4960, or BEE 4870. One course in this category must satisfy the College of Engineering Technical Writing requirement (the Technical Writing requirement may also be satisfied by specific liberal studies courses applied towards the liberal studies requirement).

9. ..... Approved Electives 6

These courses are selected by the student with approval of the student's Faculty Advisor.

TOTAL MINIMUM 126

[a]Students choose two of the following four courses: BIOMG 1350, BIOG 1440, BIOG 1445 or BIOEE 1610, plus BIOG 1500. Students must complete at least 15 credits in the Biological Sciences category. All bio courses must be taken for letter grade.

[b]Upper-level Biology: any biology course at the 2000-level or above which has a biology prerequisite and is taken for a letter grade. This requirement may also be satisfied by an upper-level course in a science department (excluding engineering, fine arts, liberal studies and mathematics) which has a biology (not social science) content of 95% or greater and a biology prerequisite. Students must receive approval for these alternative courses by consulting their BE faculty advisor or the main BE Advising Office, 207 Riley-Robb Hall. One credit seminars may not be used to meet this requirement. Up to 4 credits of BIOG 4980 or 4990, but not BIOG 2990, may be used in this category if taken for letter grade.

[c]Engineering distribution requirement is satisfied by ENGRD 2020 and ENGRD/BEE 2600 or ENGRD/BEE 2510

Concentrations

All students are required to complete a concentration. Concentrations represent areas in biological engineering that relate to individual interests or preparation for careers or graduate study. The concentrations are intended to help in choosing electives while planning an individual curriculum. The three concentrations are *Biomedical Engineering, Bioprocess Engineering and Bioenvironmental Engineering.*

Special Courses

Courses numbered 10XX, such as PHYS 1012, do not count toward graduation requirements. Academic Excellence Workshops (ENGRG 1091, 1092, 2093 and 2094) may not be used as Biological Engineering Electives.

Transfer Credit

All transfer credit for the engineering major must be approved before it will be posted on the Cornell transcript. Courses completed prior to matriculation will be evaluated when the student matriculates at Cornell. Courses taken outside of Cornell after matriculation must be approved before the student enrolls in them to ensure credit will count toward the engineering degree. If a transfer course meets the subject matter content, but lacks full credit content, the student must fulfill the credit requirement by petitioning the College of Engineering to substitute engineering credits.

Physical Education

Two semesters of physical education are required. All students must pass a swim test prior to graduation. Transfer students are exempted from one semester of PE for each full-time semester they transfer into Cornell.

Letter and S/U Grading

All courses must be taken for letter grade except for Liberal Studies and Approved Electives.

Additional program information is provided at the Courses of Study website in the College of Engineering section and in the College of Engineering Undergraduate Handbook.